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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,157	10/31/2001	Beth T. Logan	200301980-2	8521

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EXAMINER	
MAHMOUDI, HASSAN	

ART UNIT	PAPER NUMBER
2165	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/004,157	LOGAN ET AL.	
	Examiner	Art Unit	
	Tony Mahmoudi	2165	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

SAM RIMELL
PRIMARY EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remarks

1. In response to communications filed on 16-March-2005, claims 1-2, 14, 29-30, 35-36, 41-42 and 45-48 are amended per applicant's request. Claims 1-48 are presently pending in the application, of which, claims 1, 35, 42, and 45-48 are in independent form.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1-2, 6, 16, 29-32, 35-36 and 39-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yourlo (U.S. Patent No. 6,201,176) in view of Sanderson (U.S. Patent No. 6,545,485.)

As to claims 1 and 35, Yourlo teaches a method for determining similarity between a plurality of musical works (see Abstract, and see column 1, lines 5-10) comprising the steps of:

obtaining respective digitized audio files of the plurality of musical works (see column 1, lines 37-47, and see column 7, lines 64-66);

for each musical work in the plurality, (ii) a rhythmic beat representation from the corresponding audio file (see column 1, lines 43-47, and see column 5, lines 37-42);

for a given musical work of interest:

(b) comparing its rhythmic beat representation to the rhythmic beat representations of the musical works in the plurality (see column 6, lines 30-38); and

(c) summing, including respective weighting of results of the comparisons in (a) and (b), (see column 5, lines 58-65, and see column 6, lines 49-53) the summed results providing an indication of which musical works in the plurality are similar to the given musical work of interest (see column 10, lines 16-57, and see column 11, lines 10-26.)

Yourlo does not teach forming spectral signature based on spectral features from the corresponding audio file; and comparing its spectral signature to the spectral signatures.

Sanderson teaches forming spectral signature based on spectral features from the corresponding audio file; and comparing its spectral signature to the spectral signatures (see Abstract; column 5, lines 64-67; see column 6, lines 24-57; column 7, lines 56-67; and see column 11, lines 36-54.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo to include forming spectral signature based on spectral features from the corresponding audio file; and comparing its spectral signature to the spectral signatures.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo by the teaching of Sanderson, because including forming spectral signature based on spectral features from the corresponding audio file; and comparing its spectral signature to the spectral signatures, would enable the system to classify pieces (segments) of an audio file, categorize the audio files into groups based on their characteristics, and store the categories in a database for selective retrievals.

As to claims 2 and 16, Yourlo as modified, teaches wherein forming a spectral signature (see Sanderson, column 6, lines 24-57) includes dividing the corresponding audio file into a plurality of frames (see Yourlo, column 5, line 66 through column 6, line 5.)

As to claim 6, Yourlo as modified, teaches further comprising performing a windowing function on each frame (see Yourlo, column 3, lines 20-28.)

As to claim 29, Yourlo as modified, teaches generating a set of similar musical works for a given musical work of interest (see Yourlo, column 10, line 58 through column 11, line 9.)

As to claims 30, 41 and 44, Yourlo as modified, teaches visually displaying on a display device, the musical works in a manner illustrating relative similarities or dissimilarities of the musical works (see Yourlo, column 12, lines 33-44, and see column 15, line 28 through column 16, line 15.)

As to claim 31, Yourlo as modified, teaches calculating a relative distance between each pair of musical works (see Yourlo, Abstract, and see column 3, lines 19-38.)

As to claim 32, Yourlo as modified, teaches constructing a matrix of song similarity based on the relative distance (see Yourlo, column 2, lines 51-57.)

As to claim 36, the applicant is directed to the remarks and discussions made in claims 1 and 35 above.

As to claim 39, Yourlo as modified, teaches further comprising providing a respective reliability measure associated with each representation (see Yourlo, column 8, line 63 through column 9, line 9.)

As to claim 40, Yourlo as modified, teaches wherein the step of summing includes weighting results of the comparisons as a function of reliability measures of the representations compared (see Yourlo, column 9, line 10 through column 11, line 57.)

As to claim 42, the applicant is directed to the remarks and discussions made in claim 1 above.

As to claim 43, Yourlo as modified, teaches weighting the summed results (see Yourlo, column 6, lines 49-63.)

As to claim 45, Yourlo teaches a computer program product for determining similarity between a plurality of musical works, the computer program product including a computer usable medium having computer readable code thereon (see column 15, lines 28-42), including program code which:

For the remaining steps of this claim, the applicant is directed to the remarks and discussions made in claim 1 above.

As to claim 46, Yourlo teaches a computer data signal embodied in a carrier wave for (see column 5, line 66 through column 6, line 14) determining similarity between a plurality of musical works (see Abstract), comprising program code (see column 22, lines 14-28.):

For the remaining steps of this claim, the applicant is directed to the remarks and discussions made in claim 1 above.

As to claim 47, Yourlo teaches a computer system (see column 15, lines 28-55) comprising:

a processor (see column 15, line 66 through column 16, line 1);

a memory system connected to the processor (see column 16, lines 1-2); and

a computer program, in the memory (see column 20, lines 29-32) which determines similarity between a plurality of musical works.

For the remaining steps of this claim, the applicant is directed to the remarks and discussions made in claim 1 above.

As to claim 48, Yourlo teaches a system for determining similarity between a plurality of musical works, (see Abstract) the system comprising:

For the remaining steps of this claim, the applicant is directed to the remarks and discussions made in claim 1 above.

4. Claims 3-5, 7-13, and 17-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yourlo (U.S. Patent No. 6,201,176) in view of Sanderson (U.S. Patent No. 6,545,485), as applied to claims 1-2, 6, 16, 29-32, 35-36 39-48 above, and further in view of Hoory et al (U.S. Patent No. 6,678,655.)

As to claims 3 and 17, Yourlo as modified, still does not teach converting each frame to a spectral representation to obtain a plurality of spectral representations for the audio file.

Hoory et al teaches a method for speech recognition (see Abstract), in which he teaches converting each frame to a spectral representation to obtain a plurality of spectral representations for the audio file (see column 2, lines 5-20.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, to include converting each frame to a spectral representation to obtain a plurality of spectral representations for the audio file.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, by the teaching of Hoory et al,

because converting each frame to a spectral representation to obtain a plurality of spectral representations for the audio file, would enable the system to assign weights to a plurality of audio file features, for comparing and retrieval of an audio file best matching the desired audio features.

As to claim 4, Yourlo as modified, teaches wherein the spectral representation includes a vector of Mel-frequency cepstral coefficients (see Hoory et al, column 2, lines 55-62, and see column 4, lines 39-42.)

As to claims 5 and 18, Yourlo as modified, teaches wherein each spectral representation includes a plurality of Mel-frequency cepstral coefficients (see Hoory et al, column 5, lines 10-14.)

As to claim 7, Yourlo as modified, still does not teach applying a Hamming window on each frame.

Hoory et al teaches applying a Hamming window on each frame (see column 4, lines 45-54, and see column 5, lines 35-39.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, to include applying a Hamming window on each frame.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, by the teaching of Hoory et al,

because applying a Hamming window on each frame, would result in the line spectrum, corresponding to each base function sampled at the pitch frequency multiples, to be converted to a DFT spectrum (see Hoory et al, column 5, lines 35-38.)

As to claim 8, Yourlo as modified, still does not teach applying a pre-emphasis on each frame.

Hoory et al teaches applying a pre-emphasis on each frame (see column 4, lines 45-50.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, to include applying a pre-emphasis on each frame.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, by the teaching of Hoory et al, because applying a pre-emphasis on each frame, would pre-emphasize the input speech signal, which is then fed to the windowing for Ham transformation (see Hoory et al, column 4, lines 46-50.)

As to claim 9, Yourlo as modified, teaches subjecting data from each frame to a Fast Fourier Transform function to obtain a frequency domain signal for each frame (see Hoory et al, column 4, lines 50-54.)

As to claim 10, Yourlo as modified, teaches warping a log amplitude of each frequency signal to a Mel-frequency scale (see Hoory et al, column 4, lines 54-66.)

As to claim 11, Yourlo as modified, teaches subjecting the warped frequency function to a second Fast Fourier Transform to obtain a parameter set of Mel-frequency cepstral coefficients (see Hoory et al, column 5, lines 35-64.)

As to claim 12, Yourlo as modified, teaches subjecting the frequency domain signal for each frame to a set of triangular filters to obtain a plurality of Mel-frequency spaced components (see Hoory et al, column 4, lines 50-54, and see column 5, line 40 through column 6, line 9.)

As to claim 13, Yourlo as modified, teaches subjecting the Mel-frequency spaced components to a discrete cosine transform function to obtain a plurality of Mel-frequency cepstral coefficients (see Hoory et al, column 5, lines 15-20.)

As to claim 19, Yourlo as modified, teaches computing a similarity matrix for the audio file (see Yourlo, column 4, lines 6-7.)

As to claims 20 and 21, Yourlo as modified, teaches computing a beat spectrogram for the audio file (see Yourlo, column 12, lines 1-9.)

As to claim 22, Yourlo as modified, teaches normalizing the histogram to account for the total number of frames of the audio file (see Yourlo, column 8, line 58 through column 9, line 9.)

As to claim 23, Yourlo as modified, teaches calculating a distance between a pair of histograms (see Yourlo, column 13, lines 16-37.)

As to claim 24, Yourlo as modified, teaches wherein calculating the distance includes calculating the closest distance between the pair of histograms (see Yourlo, column 14, lines 28-33.)

As to claim 25, Yourlo as modified, teaches wherein the closest distance is the minimum of the sum of absolute differences between bins of each histogram calculated over a range of scalings of each histogram (see Yourlo, column 14, lines 34-47.)

As to claim 26, Yourlo as modified, teaches applying a function to each histogram to weight certain bins (see Yourlo, column 6, lines 49-53.)

As to claim 27, Yourlo as modified, teaches scaling each histogram at least twice to allow for slight differences between musical works (see Yourlo, column 11, lines 36-67.)

As to claim 28, Yourlo as modified, teaches wherein for each scale factor, one histogram is resampled by a factor and compared to the unsealed histogram (see Yourlo, column 6, lines 14-20.)

5. Claims 14-15, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yourlo (U.S. Patent No. 6,201,176) in view of Sanderson (U.S. Patent No. 6,545,485) and further in view of Hoory et al (U.S. Patent No. 6,678,655), as applied to claims 3-5, 7-13, and 17-28 above, and further in view of Walker et al (U.S. Patent No. 6,710,822.)

As to claim 14, Yourlo as modified, still does not teach clustering the spectral representations of the audio file to obtain a spectral signature for the audio file.

Walker et al teaches signal processing method (see Abstract), in which he teaches clustering the spectral representations of the audio file to obtain a spectral signature for the audio file (see column 5, lines 16-35, and see column 9, lines 42-56.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, to include clustering the spectral representations of the audio file to obtain a spectral signature for the audio file.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, by the teaching of Walker et al, because clustering the spectral representations of the audio file to obtain a spectral signature for the audio file, would enable the system to distinguish voice segments (see Walker et al, column 5, lines 26-28.)

As to claim 15, Yourlo as modified, teaches comparing the spectral signatures of two different audio files using an Earth Mover's Distance (see Walker et al, column 12, lines 1-45.)

As to claim 33, Yourlo as modified still does not teach performing a Multi-dimensional scaling on the matrix to obtain coordinates in K-dimensional space for each musical work, one coordinate per song.

Walker et al teaches performing a Multi-dimensional scaling on the matrix to obtain coordinates in K-dimensional space for each musical work, one coordinate per song (see column 11, line 41 through column 12, line 7.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, to include performing a Multi-dimensional scaling on the matrix to obtain coordinates in K-dimensional space for each musical work, one coordinate per song.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, by the teaching of Walker et al, because performing a Multi-dimensional scaling on the matrix to obtain coordinates in K-dimensional space for each musical work, one coordinate per song, would enable the system to measure differences between various features of various songs.

As to claim 34, Yourlo as modified teaches plotting the coordinates (see Yourlo, column 9, lines 13-15.)

6. Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yourlo (U.S. Patent No. 6,201,176) in view of Sanderson (U.S. Patent No. 6,545,485, as applied to claims 1-2, 6, 16, 29-32, 35-36 and 39-48 above, and further in view of Bloom et al (U.S. Patent No. 4,591,928.)

As to claim 37, Yourlo as modified, still does not teach the step of preprocessing the audio files before forming the different representations for each musical work.

Bloom et al teaches a method of processing audio signals (see Abstract), in which he teaches preprocessing the audio files before forming the different representations for each musical work (see column 22, lines 30-46, and see column 23, lines 22-60.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, to include preprocessing the audio files before forming the different representations for each musical work.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Yourlo as modified, by the teaching of Bloom et al, because preprocessing the audio files before forming the different representations for each musical work, would allow the system to filter out any noise in the audio file prior to using the file as input to the comparison unit for similarities between musical works.

As to claim 38, Yourlo as modified, teaches wherein the step of preprocessing includes omitting relatively long pauses (see Bloom et al, column 22, lines 30-46, and see column 23, lines 22-60.)

Response to Arguments

7. Applicant's arguments filed on 16-March-2005 with respect to the rejected claims in view of the cited references have been fully considered but they are moot in view of the new grounds for rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Tony Mahmoudi whose telephone number is (571) 272-4078. The examiner can normally be reached on Mondays-Fridays from 08:00 am to 04:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici, can be reached at (571) 272-4083.

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May 5, 2005

SAM RIMELL
PRIMARY EXAMINER